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SOCIAL CONTAGION AND KNOWLEDGE ACQUISITION IN CONSTRUCTION PROFESSIONAL SERVICE FIRMS

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ABSTRACT

The construction industry in Ireland, including professional service firms (PSF's) operating therein, are undergoing a period of change and uncertainty driven by economic, demographic, political and technological factors. While considerable evidence exists demonstrating the relationship between environmental turbulence on organisational decision making, there remains a distinct lack of focus on behavioural patterns affecting decision-making process of construction firms. Social contagion (SC) theory asserts that the spread of ideas, attitudes, or behaviour patterns in a group is achieved through imitation and conformity, and is well established within social sciences research, and is increasingly being used to analyse organisational behaviour. However, limited inquiry has been launched into SC theory within construction contexts, particularly within high knowledge intensive PSFs. Using a literature-based meta-synthesis, an exploration as to the usefulness of SC theory in the field of knowledge management in construction is presented. A framework for the analysis of knowledge acquisition using SC theory is provided, as part of an ongoing doctoral study. Based on the interpretations that social contagion research and learning for construction PSF's are in fact two sides of the same social epistemological coin, a theoretical framework for the synthesis of social contagion into the body of theoretically informed research in construction is thus proposed.

Keywords: construction professional service firms, knowledge acquisition, organisational learning, social contagion, strategy.

INTRODUCTION

As global construction markets evolve, knowledge intensive construction professional service firms (CPSF) are required to formulate and implement a strategy in pursuit of competitive advantage. Knowledge is a key success factor in making strategic decisions (Egbu, 1999; Hassan et al., 2016) but construction researchers are yet to fully analyse contagion in the industry and its potentially far-reaching effect. PSF's in the Architectural, Engineering and Construction (AEC) sector seek to gain competitive advantage via superior knowledge which is increasingly facilitated using strategic investments in new knowledge. BIM compliance, lean construction techniques, augmented reality (AR) are some of many mechanisms by which firms are seeking to differentiate themselves from the competition. However, despite studies documenting

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the increasing adoption of new knowledge tools and methods, previous research has failed to demonstrate the underlying factors behind the decision to acquire new knowledge in CPSFs or explain where the social constructs behind knowledge acquisition fit into established strategic management theory.

Construction organisations dedicate a sizable part of their budget to knowledge management (i.e. creation, acquisition, distribution or storage), however little evidence currently exists to confirm whether this knowledge investment leads to improved decision making (Egbu, 1999). Why is it, then that such an investment is made without confirmation of potential return or investigation for causality? We examine two latent social contagion processes inherent in the acquisition of knowledge in CPSFs: response to new knowledge from an industry knowledge leader (referred to as “Ego-network” in social networks terminology) and the knowledge diffusion process whereby individual firms eventually become clustered and almost non-differentiated in knowledge terms (henceforth termed “contagion”). We hereafter propose that the “*contagion effect*” may be a determinant in shaping organisational decision making and strategic direction. In seeking to understand the potential impact of social contagion in construction PSF’s decision making, a meta-analysis of existing research in both fields is undertaken before presenting a theoretical framework for the dissemination of new knowledge within construction PSF’s is presented. Propounding this framework will help construction researchers understand the subtle effect of contagion theory in the context of highly knowledge intensive construction PSFs.

In the sections that follow, the contagious effect of new knowledge is put forward, forming the background for further research inquisition in the social contagion theory and knowledge management domain in construction. The results of the theoretically constructed conceptual framework are presented and discussed in subsequent sections.

CONTEXT

Carrillo & Chinowsky (2006) highlighted the benefits of an effective KM system in construction firms, but highlighted that strategic efforts have been hampered by the different approaches and a lack of distinction about how these systems work. Within the field of construction, there is still a paucity of empirically tested theories identifying possible links to the motivations for firms to acquire new knowledge. Furthermore, there is limited research-based inquisition as to what drives new knowledge acquisition initiatives in praxis. It, therefore, begs the question: are CPSFs acquiring knowledge simply to gain competitive advantage or are they merely keeping up with industry trends? Early strategy theorist, Penrose (1959) noted that the processes of knowledge acquisition and application are key to firm growth and performance, but there is no explicit reference as to how this can be achieved particularly in knowledge-intensive firms in construction. Managers in construction PSF’s believe that gaining new knowledge helps firm reputation and gives leverage with the ability to offer new services and most importantly the differentiation required to gain competitive advantage (Murphy, 2013). This premise drives managers to seek knowledge leadership, adopt new technology and train staff on contemporary business solutions to keep up with industry trends. However, there is limited evidence that empirically correlates the acquisition of new knowledge with increased competitiveness for construction professional service firms (CPSFs). Egbu (2000) stressed the need for the potential inherent in acquisition and sharing of knowledge to

be harnessed and maximised for project-level and industry level benefits, but construction literature is still lacking as to whether managers evaluate the return on investment (ROI) of knowledge acquisition on strategy.

This brings about the question of what influences knowledge acquisition and how does new knowledge move through a professional service firm? Given the monetary resources invested in the acquisition of new knowledge, an inquisition into the drivers of the knowledge within construction PSFs is thus warranted. We propose that peer influence resulting from social contagion may affect knowledge acquisition in CPSFs, and that one possible explanation may be that the source of influence is likely to be due to knowledge diffusion via Communities of Practices (CoP's). A community of practice (CoP) is usually referred to as the engine which organisations use to unlock the potential of its resources, mainly knowledge and people, to reach strategic goal of sustained competitiveness (Elmualim & Govender, 2008). The social network neighbourhoods of professionals are likely to be contained within these CoPs, as they will tend to form knowledge clusters that has an eventual effect on the firms' overall strategy. The unit of analysis theoretically under consideration primarily consists of architectural, engineering and surveying (AES) firms in construction in Ireland, and the contagion effects is succinctly measured by the two components: the *erosion of differentiation* and *knowledge clustering*.

Knowledge management in CPSFs: The identity Perspective

Webb (1998) defined knowledge management as the "...identification, optimisation and active management of intellectual assets to create value, increase productivity, and gain and sustain competitive advantage" (cited in Hassan, 2016: 736). While this definition may be considered valid, the assertion does not specify cause or effect; neither does it identify how knowledge impacts decisions taken by the firm.

Yang (2011) asserted that KM is primarily concerned with identifying/creating, assimilating, and applying organisational knowledge to exploit new opportunities and enhance organisational performance which is a conclusion previously drawn by Drucker (1993). Several authors in construction research have suggested that knowledge can be used as a strategic asset to maintain competitiveness and create a niche for the firm within a particular sector of activity (Bergeron and Raymond, 1992; Egbu, Hari & Renukappa, 2005), without a clear evidence of "how" this knowledge translates into competitive advantage or results in improved decision making.

From a construction-specific perspective Egbu (1999), in a study of construction refurbishment managers, concluded that decision-making was a key knowledge asset that they needed to do their job. The author was one of the early researchers who empirically tested the link between knowledge and decision-making, and asserted that due to the impromptu nature of decisions involved in construction, knowledge was critical to competitiveness for managers in the refurb section in construction. In a later work, Egbu et al. (2004) confirmed that most construction organisations do not have a structured approach for the selection of techniques and technology for KM. Thus, this leaves no evidence as to "causation" for implementing KM practices, leaving a possible assumption of "social contagion" effect.

For construction PSF's, the potential for social contagion is even more pronounced, due to one or more of the following reasons:

- high knowledge intensity (Teece, 2007),
- highly professionalised workforce (Von Nordenflycht, 2010),
- high employee bargaining power & preferences for autonomy (Lowendahl, 2000),
- high reliance on the experience of staff in the organisation (Maister, 1993),
- high level of theoretical knowledge of an academic type (Abbott, 1988).

The last characteristic listed above is of particular importance within the current investigation, as this knowledge intensive nature of construction PSF's may result in these firms becoming like "herding cats" as described by Lowendahl (2000). Social contagion as a research theme in knowledge management studies in construction is a relatively underdeveloped, as limited evidence exists in the body of knowledge about academic inquiry into the phenomenon. Since the early 1990s, there has been an expanding academic literature on different strands of strategic management in the construction sector, but there are very limited empirical studies in behavioural research in construction, much less in PSFs. Pryke (2012) went some way towards addressing this gap by investigating the construction sector as a social network, and we build on that premise to draw attention to a possible explanation of an emergent knowledge acquisition process in construction PSF's.

Acquiring knowledge: the social contagion effect

Establishing a nexus between the established field of KM and the nascent discipline of social contagion in the construction sector may be usefully understood as two sides of the same coin, which are not necessarily given proportionate attention. On one hand, KM theories are well grounded within the existing body of knowledge in construction (see Egbu, 1999; 2005), with its largely process-centric approach. On the other, social contagion research is currently lacking a conceptual framework or organising principle within construction management research, perhaps due to its phenomenological nature. Burkhardt (1994) distinguished between two types of contagion effect: contagion by cohesion and contagion by structural equivalence. Contagion by cohesion refers to the influence of those who had direct communication (Sundararajan et al., 2010) and occurs among professionals in the workplace, colleagues, associates or those with whom the construction professional collaborates with closely on projects. The other form of contagion is by structural equivalence, which refers to influence exerted by people with which one has similar communication patterns (Sundararajan et al., 2010). This form of contagion is more widespread and develops from communication or learning patterns, and it similar to those inherent in professional bodies or communities of practice in construction.

Grudz (2010) highlighted a correlation between social contagion and the capacity to innovate for an individual, linking it with the contagion by structural equivalence as put forward by Burt (1987). These ties in the context of construction PSF's may be industry networks or Communities of Practice (CoP). Authors in network science research consider that communication networks serve as a mechanism that exposes people, groups, and organisations to information, attitudinal messages and the behaviours of others (Burt, 1980; 1987). Consequently, this exposure is expected to increase the likelihood that network members will develop assumptions, knowledge,

and attitudes similar to those of their networks (Carley & Kaufer, 1993). Erickson (1988) affirms that other factors such as frequency of interaction, multiplexity, the strength of association, and asymmetry are other vital points that shape the effect that social contagion exerts on the influence of individuals in within a given network.

In the context of this inquiry, we use one of the clearest and most inclusive definitions of social contagion as proposed by The Handbook of Social Psychology (Lindzey and Aronsson, 1985). They define social contagion as the spread of effect or behaviour from one crowd participant to another, where one individual serves as the stimulus for the imitative actions of another. This definition clearly relates the “herding” effect or “cat herding” as put forward by Løwendahl (2000) as seen in knowledge acquisition in PSFs. This definition focuses on the contagion phenomenon observable in construction circles, where professionals often acquire knowledge based on industry networks or communities of practice (Love et al., 2011). Using evidence from Wenger (2000), Love et al. (2011) suggested that knowledge acquisition is enhanced via situated practice, whose sense of purpose, common identity and place is important in the context of construction. This implies that the desire for knowledge among construction PSF’s may be driven by association with professional membership or communities of practice. In further reflections on the social influence of communities of practice (CoP), Wenger (2000) noted that CoPs tend to mould their members to conform to the knowledge experiences of the community until the learner himself reflects the competence (gained by knowledge) of the community. Conversely, a new knowledge experience will also pull a community’s competence along, and when a member brings in some new element into the industry, professionals within that industry will not take long before they adopt this contribution as a new element of competence and competitive advantage—or reject it outright. An example is when an influential member of a CoP returns from a technical seminar with a new insight or technological expertise. Repeated emphasis on the new technology may spur other members of the community to take courses and develop competency in that technology. However, this may occur without carefully checking the return-on-investment of that knowledge investment.

Research in medical and social science fields (Marsden, 2005) has demonstrated the existence and veracity of the observed phenomenon in practice. We begin to fill that gap within construction via this investigation, sparking fresh conversations about contagion within the KM domain. The general idea of social contagion suggests that as a result of social influence, individuals adopt behaviours or attitudes of others within the social network they communicate (Burt, 1987). Thus, the social contagion theory is explored in CPSFs, using knowledge acquisition as a proxy for investigating how new knowledge can become “contagious” and can be transmitted from professional to another within a knowledge community. We employ a non-statistical technique i.e. meta-synthesis, and present a framework for social contagion processes that occur during knowledge acquisition in CPSFs, exploring how individual firms get influenced to acquire new knowledge via eroding differentiation. Although the review is part of an ongoing doctoral study, the framework will subsequently be validated with data from the industry in a further investigation of the phenomena.

DISCUSSION: KNOWLEDGE HERDING OR A FEAR OF BEING LEFT OUT? AN IRISH EXAMPLE

As professionals strive to become knowledge leaders within the construction sector, it is important to ask “why” they choose to pursue knowledge about a particular matter (for instance BIM) without reasons for making the decision. Particularly in the light of recent economic events in the Irish economy and the looming threat of BREXIT, professional service firms need to realign their knowledge strategy to meet with industry demands. The *Farmer Review* of the UK Construction Labour Model published in 2016, stressed the need for increased emphasis of strategic knowledge use, citing that practitioners in the industry need to use “...knowledge to effect modernisation and improve our industry at a strategic level” (Farmer, 2016; pg. 04).

On an individual firm basis, how knowledge is acquired is often a planned process, but we seek to point attention to an underlying emergent knowledge acquisition phenomenon. Drawing on secondary data from a 2015 survey of BIM adoption in the construction industry by Enterprise Ireland in conjunction with the Construction IT Alliance (CITA), it was revealed that 67% of experts surveyed possessed confidence in their skills and knowledge to deliver BIM (Enterprise Ireland BIM report, 2015). In the report, only 6% reported no confidence and the remaining 27% reported a general knowledge of BIM and a gradual improvement in BIM skills. Despite Ireland not yet having a BIM mandate at that time, more than half of the professionals surveyed had become BIM compliant. While it is expected that Irish firms operating within the UK market would certainly need to be BIM compliant to compete adequately, it appears that the remaining firms, whose operations concentrate on the domestic market are demonstrating a social contagion effect. This phenomenon observed combined with evidence from the literature strengthens the proposed framework for the effect of social contagion (see Figure 1).

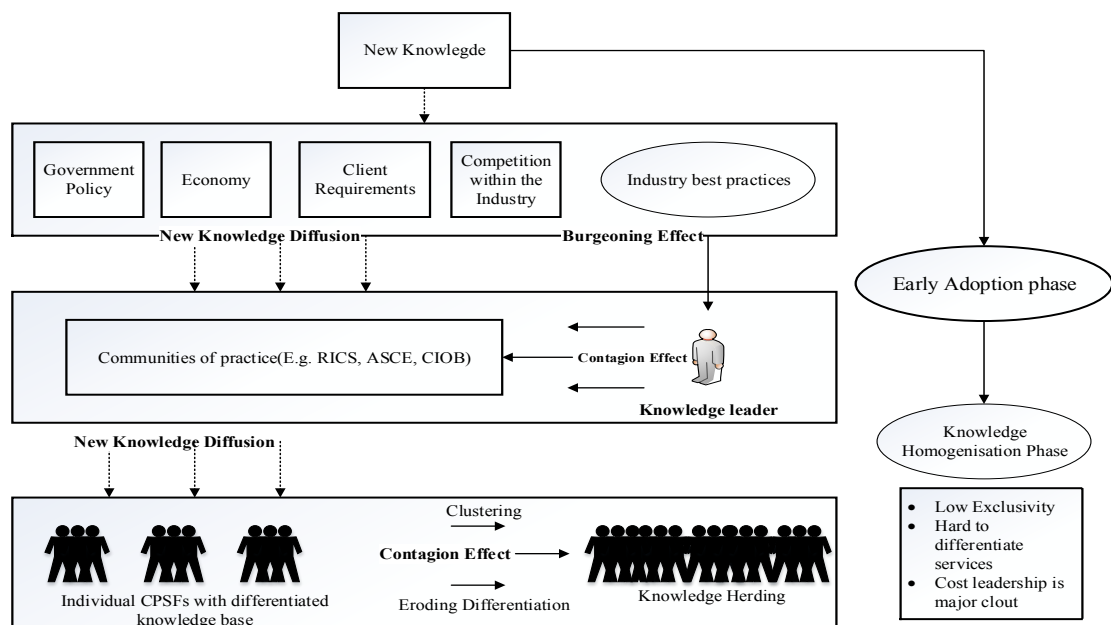


Figure 1: Social Contagion Framework for new knowledge acquisition in CPSFs

Figure 1 above shows how social contagion affects new knowledge acquisition within CPSFs, from the early adoption phase (industry knowledge leader or first adopter of specific knowledge) through to the communities of practice and consequently the professional service firms in the industry. Strategy researchers in construction agree

that differentiation is core competitive strategy for the survival in construction (Cheah & Chew, 2005; Murphy, 2013) and we posit that knowledge acquisition via SC has the potential to erode differentiation, leaving firms with no other option for strategic choice except cost leadership. It is important to state that the intention of this paper is not to propound a new theory of social contagion on how professionals acquire knowledge in construction, but to put forward indicators as to its salient effect on learning and ultimately strategic decision making. This is consistent with the principles of phenomenological research (Holt & Goulding, 2014), which allows for exploration of an emerging trend from data during the course of analysis. The meanings depicted in the framework are implicit, and will be validated during the second phase of the study.

The framework theorises how new knowledge flows through the industry via the contagion effect, and how it results in “knowledge herds”, and subsequently its significant effect on the sector as a whole. Knowledge leaders are key to the diffusion of knowledge into communities of practice and consequently, individual CPSFs. An important outcome of the social contagion effect on knowledge acquisition in CPSFs is that individual firm loses their uniqueness, and start to pursue a form of knowledge “herding”. This type of herding results from social influences exerted by forces external to the CPSF, and that are at times subtle and hard to quantify mathematically. Oyewobi (2014) argued that these types of phenomenological issues are complex, and often latent, yet impact the performance of firms. Baddeley (2010) criticises the neglect of social influence on herding as a phenomenon, arguing that researchers neglect sociological and psychological factors. Thus, we explain herding in knowledge acquisition as the outcome of social contagion (socio-psychological influences), and it is a reflection of interactions between different cognitive and emotional decision-making actors. Thus, we recommend that an inter-disciplinary approach to further study in this area is needed, incorporating ideas from a range of disciplines including sociology, behavioural economics, strategy and knowledge management.

IMPLICATIONS FOR LEARNING IN CPSFs

Understanding the social contagion effect puts managers in a position to be in control over the learning culture of the firm, aligning it with the strategic goals of the company. The ability to effectively manage this alignment, between knowledge acquisition and corporate goals, could potentially provide the firm with a competitive advantage. The seminal work by Porter (1996) states that strategy should create a unique and valuable position for the company, via the choice of activities that are different from those of rivals. But in the case of PSFs, this may become a herculean task, as managing professionals is synonymous with the ‘cat herding’ (Løwendahl, 2000) and many scholars agree that standard management approaches may not be effective for this peculiar workforce (Kellogg and Nie, 1995). As the recommendations of the Farmer report (2016) urges construction firms to “modernise or die”, it is imperative for CSPFs in construction to explore the potential inherent in SC in tandem with their strategic plans, as the effect of same on their individual firms grows monotonically with continued contact with CoPs and other professionals. Whereas this SC framework has created the basis for future models for knowledge acquisition, it needs to be further tested in the industry for validation on a larger scale. Based on the proposed framework, we suggest that the probability of contagion is increased in CPSFs, based on the requirements of its members to belong to

professional bodies and knowledge communities. This, in turn, may impact “knowledge diversity”, and stifle innovation since the knowledge base within communities converge. More broadly, our framework shows how the presence of an influential knowledge leader within CoPs may influence the structural direction of knowledge within firms and professional bodies.

Social contagion thus presents a useful mechanism for explaining knowledge acquisition trends in this highly skilled area, demonstrating the importance of acknowledging the phenomenon prior to investing in new knowledge – and to consider each of the component parts of the framework to ensure that knowledge acquisition will, in fact, contribute to strategic objectives – and that the knowledge is not acquired purely for fear of being left behind within the industry.

Thus, knowledge “herding” via social contagion may erode the differentiating factors required for sustained competitive advantage in a cyclical and uncertain industry such as construction, particularly the services sector in the field. The framework shows how knowledge acquisition may become contagious via transmission through knowledge leaders, and via CoPs from one member to another. This proposition complements the traditional sources of antecedents of knowledge management in construction and suggests that knowledge leaders and CoPs play an important multiplier role in engendering new knowledge acquisition.

Understanding the social contagion effect and its contribution to how CPSFs acquire knowledge will allow managers to craft a clear knowledge acquisition strategy, rather than simply following the crowd.

CONCLUSIONS AND RECOMMENDATIONS

Several prior studies have confirmed that PSF’s in construction often rely on differentiation in pursuit of competitive advantage (Murphy, 2013). While prior cognitive research studies in social contagion in construction have investigated areas such as how organisation-levels impact empowerment cognitions (Seibert et al. 2011) and psychological empowerment cognition contagion (Tuuli & Acquah, 2012).

This study suggests that some strategic decisions within construction PSF’s may be influenced by social contagion including knowledge acquisition strategy. The social contagion theory of knowledge acquisition, therefore, exposes an important antecedent of firms seeking to gain knowledge for competitive advantage, pointing out the possible influence of CoPs as contagion nodes.

Future research may focus on the empirical data to support the proposition put forward in this paper, to find answers to questions regarding conscious or unconscious processes that influence learning for construction professionals. Lastly, this study sets the stage for further theory building in social contagion studies within the KM domain in construction management research, specifically in knowledge acquisition.

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